Math 1210: Worksheet #10 **Fall 2017**

Name: ANS	A#:	Section:

[3] 1. $\int_0^{\frac{\pi}{4}} \sin(x)\sec^6(x)dx$ $= \int_0^{\frac{\pi}{4}} \tan x \sec x \sec^4 x \, dx$

$\left(\begin{array}{l} u = \sec x \\ du = \tan x \sec x \, dx \end{array} \right)$ $\begin{array}{l} u(0) = 1 \\ u(\frac{\pi}{4}) = \sqrt{2} \end{array}$

$= \int_1^{\sqrt{2}} u^4 du$

$= \left[\frac{u^5}{5}\right]_1^{\sqrt{2}} = \frac{4\sqrt{2}-1}{5}$

[3] 2. $\int_0^{\ln(2)} \frac{e^{2x}}{e^{2x}+1}dx$

$\left(\begin{array}{l} u = e^{2x}+1 \\ du = 2e^{2x}dx \end{array} \right)$ $\begin{array}{l} u(0) = 2 \\ u(\ln 2) = e^{2\ln 2}+1 = 5 \end{array}$

$= \int_2^5 \frac{1}{u}\frac{du}{2}$

$= \left[\frac{\ln(u)}{2}\right]_2^5 = \frac{\ln(5)-\ln(2)}{2} \left(= \ln\sqrt{\frac{5}{2}} \right)$

OKAY ↑

[3] 3. $\int_0^{\frac{1}{2}\ln(3)} \frac{e^x}{e^{2x}+1}dx$

$\left(\begin{array}{l} u = e^x \\ du = e^x dx \end{array} \right)$ $\begin{array}{l} u(0) = 1 \\ u(\frac{1}{2}\ln 3) = \sqrt{3} \end{array}$

$= \int_1^{\sqrt{3}} \frac{dx}{x^2+1} = [\arctan x]_1^{\sqrt{3}} = \frac{\pi}{3} - \frac{\pi}{4} = \boxed{\frac{\pi}{12}}$

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Grader: deduct $\frac{1}{2}$ for "$\arctan\sqrt{3} - \arctan 1$"

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